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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/924,178	08/07/2001	Shannon A. Wichman	00-697 (4028-00700)	2686

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EXAMINER

COLEMAN, ERIC

ART UNIT	PAPER NUMBER
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2183

DATE MAILED: 05/26/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/924,178

Applicant(s)

WICHMAN, SHANNON A.

Examiner

Eric Coleman

Art Unit

2183

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-21 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-3,8-10,17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ronen (Patent No. 6,675,376).

3. Ronen taught the invention substantially as claimed including a data processing ("DP") system comprising:

a) Pipeline processor (e.g., see fig.5);

b) Means and method for fetching a number of instructions (137) (e.g., see fig. 5 and col. 2, line 55-col. 3, line 53); and

c) Means and method for combining a plurality of instructions into a control word which can be processed by one execution unit (e.g., see fig.3 and col. 5, line 61-col. 6, line 13).

4. Ronen did not expressly detail (claim 1,8,17) that the number of instructions fetched was greater than the number of execution units. However Ronen taught three execution units (Floating point execution unit, integer execution unit, and fused execution unit). The fused instruction unit was capable of executing a fused instruction that comprised the combination of two fetched instructions. Consequently, the system

comprised the capability of executing a total of four instructions using three execution units. One of ordinary skill therefore would have been motivated of fetching four instructions so that the system would have executed the instructions at maximum efficiency and maximum capacity. Fetching four instructions would have comprised more instructions than the number of execution units that comprised three execution units (e.g., see fig. 5 and col. 5, line 61-col. 6, line 13).

5. As per claim 2, Ronen taught two instructions combined into a control word (e.g., see col. 3, lines 15-32).

6. As per claim 3,9, Ronen taught means and method for issuing the control word to an execution unit (e.g., see col. 8, lines 1-23).

7. As per claim 10, Ronen taught execution stage (143c) executing the control word (e.g., see fig. 5).

8. Claims 4-7,11-16,18-21are rejected under 35 U.S.C. 103(a) as being unpatentable over Ronen as applied to claims 1-3,8-10,17 above, and further in view of Blaner (patent No. 6,029,240).

9. As per claims 4,11,16,20,Blaner taught system with four execution units (461,462,463,464) (e.g., see fig.10 and col. 20, lines 41-65). As to the limitation of fetching at least 5 instructions Ronen as discussed above taught fusing or combining two instructions into a single instruction that was executed by the execution unit. Consequently the combination of the Ronen and Blaner teaching would have yielded a system with four execution units where at least one execution unit execution fused

instructions (e.g., see fig.10 of Blaner and fig. 5, of Ronen) this would have enabled the fetching of at least 5 instructions and the concurrent execution of at least 5 instructions.

10. It would have been obvious to one of ordinary skill in the DP art to combine the teachings of Ronen and Blaner. Both references were directed to the problems of executing plural instructions in parallel. One of ordinary skill would have been motivated to incorporate the Blaner teachings of compounding instructions and executing instruction sequences in parallel for at least reduce the amount of memory used to store instruction sequences in the combined system and this would have allowed the system to store more instructions, allow instructions to remain in cache longer and consequently reduce the chance of a cache miss (e.g., see col. 1, lines 40-65 of Ronen and col.3, lines 1-17of Blaner).

11. Further, as per claims 5,7,12,14-16,19,20,21, Blaner taught the system comprised one or more different types of functional units depending on the type of system being considered (e.g., see col. 8, lines 7-27). One of ordinary skill would have been motivated to extend the capability of performing fused instruction for each execution unit in the system to provide a more efficient execution of instructions. Extending the execution of fused instructions to the four execution units as taught by Blaner would have provided the fetching of eight instructions for fusing into four fused instructions and each instruction would have been issued and sent to the corresponding one of the four execution units for concurrent execution.

12. As per claims 6,13,18, Blaner taught grouping means and method for grouping instructions, checking instructions for conflicts and issuing valid instructions to execution units (e.g., see col. 5, lines 26-63, and col. 7, line 50-col. 8, line 41).

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Vassiliadis (patent No. Re. 35,311) disclosed a data dependency collapsing system (e.g., see abstract).


Nakanishi (patent No. 5,805,852) disclosed parallel processor performing bypass control by grasping portions in which instructions exist (e.g., see abstract).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eric Coleman whose telephone number is (703) 305-9674. The examiner can normally be reached on Monday-Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Chan can be reached on (703) 305-9712. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

EC



ERIC COLEMAN
PRIMARY EXAMINER

May 25, 2004